

SEP 18 2006

Application No. 09/929,703

**REMARKS**

Favorable reconsideration and allowance of the subject application are respectfully requested. Claims 1-3, 5, 7, 10, 13-14, 16-32 are pending in the present application, with claims 1, 13, and 16 being independent.

***Allowable Subject Matter***

Applicant notes with appreciation the Examiner's indication on page 3 of the Office Action dated April 18, 2006 that claim 13 is allowed. For at least the reasons detailed below, all pending claims should be considered allowable.

***Interview Summary***

Applicant's representative would like to thank the Examiner, Freshteh N. Aghdam, for the personal interview that was conducted on September 13, 2006. During the interview, Applicant's representative proposed amendments to clarify the independent claims, to which the Examiner noted that these features would not be considered new matter.

***Claim Rejections under 35 U.S.C. §112***

The Examiner rejected claims 1-3, 5, 7, 10, 14, and 16-31 under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. This rejections is respectfully traversed.

Based on the clarifying amendments made to at least independent claims 1 and 16, which do not add any new subject matter, Applicant respectfully requests that the

Application No. 09/929,703

Examiner withdraw the rejection.

***Further Comments Regarding Previously Cited Art***

In an Office Action dated October 31, 2005, the Examiner had rejected the claims under 35 U.S.C. §103 based on Piirainen (WO 99/33237) in view of Hwang (IEEE Journal on selected areas in communications, Vol. 7, No. 9, December 1989).

In an effort to expedited the prosecution of the present application, Applicant respectfully submits the following comments in an effort to explicitly detail that neither Piirainen nor Hwang teach or suggest the feature that modulation indices identify a type of the conveyed data based on an amplitude of the modulation index, as recited in, for example, independent claim 1.

More specifically, Hwang teaches a modification of a prior phase coded modulation scheme having continuous phase characteristics. Traditional phase modulation techniques such as quaternary phase shift keying (QPSK) had the disadvantage of causing phase discontinuities at data transitions. Such discontinuities will cause spectral spreading and lead to bandwidth inefficiencies.

Traditional multi-H phase-coded modulation (MHPM) techniques are a class of continuous phase modulation systems where the information is encoded in the phase of a carrier in a manner where the phase remains continuous at data transitions. While spectrally efficient, traditional MHPM approach may have less than desirable minimum Euclidian distance metrics. The minimum Euclidean distance in the signal space is an established performance measure which predicts the error probability at high signal to noise ratios. Longer the minimum Euclidian distances typically imply better

Application No. 09/929,703

performance characteristics. (See page 1450 of Hwang.)

Specifically, conventional MHPM schemes perform phase modulation of information utilizing two states (bipolar data +1 and -1), and utilize modulation indices  $h_{+i}$  and  $h_{-i}$  which are equal, or other in words, "symmetric." Hwang discloses an improvement for MHPM by using different values for the modulation indices  $h_{+i}$  and  $h_{-i}$ , thus leading to the name "Asymmetric" MHPH.

It is important to note that both types of MHPH utilize phase modulation, thus  $h_{+i}$  and  $h_{-i}$  are phase modulation indices, not amplitude modulation indices. This may be readily seen by inspection of the general form of the MHPM signal:

$$S(t, \alpha) = \sqrt{2E/T} \cos(\omega_c t + \varphi(t, \alpha) + \varphi_0),$$

where

$$\varphi(t, \alpha) = 2\pi \sum_{i=-\infty}^{\infty} a_i h_i f(t - (i - 1)T) \text{ for } -\infty \leq t \leq +\infty.$$

Thus, neither Hwang nor Piirainen even remotely teach or suggest that modulation indices identify a type of the conveyed data based on an amplitude of the modulation index.

Therefore, because the cited art fails to teach or suggest all of the features of the claims, either alone or in combination (which combination Applicant does not admit to), the claims should be considered allowable over the cited art.

## CONCLUSION

Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse

Application No. 09/929,703

action, it is respectfully requested that the Examiner telephone Martin R. Geissler, Applicants' Attorney at 1.703.621.7140 so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 50-3828 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully Submitted,



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